

Contamination Is Gone with the Wind

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Key Words: renewable energy, ground water remediation, resource conservation, cost reduction, mass removal

Using renewable energy to power active ground water remediation systems has the potential to

- Provide greater overall protection of human health and the environment by reducing air emissions that may be associated with the quantity of electric power generated by traditional methods.
- Conserve fossil fuel resources by reducing the demands placed on current utility power distribution grids.
- Reduce project costs and provide a viable power alternative for remote off-grid locations. Provide an important public outreach mechanism to foster the utilization of renewable energy in diverse applications.

A 10-kilowatt wind turbine is currently being used to power a ground water circulation well remediation system at the former Nebraska Ordnance Plant Superfund site. The ground water circulation well treats trichloroethylene-contaminated water and returns it to the aquifer. The coupling of this water-conserving technology with the wind turbine is an example of resource-conservative ground water remediation. Unlike passive remediation systems, it is possible to directly measure mass removal and make engineering modifications as necessary.

The current pilot system is a grid inter-tie design that employs a combination of wind-generated and utility-provided power to operate the recovery well. The system has instrumentation capable of measuring the quantity of electricity generated by the wind turbine, the quantity of electricity consumed by the remediation system, and the quantity of electricity returned or “sold” back to the utility company. The mass of contamination removed by the system is also being monitored.

Preliminary estimates indicate that the project is cost-effective relative to the use of traditional power supplies. The conversion of the system to an off-grid status with the capability to store excess energy for low-wind periods is being evaluated, and the potential for constructing systems specifically designed to be operated by renewable power, both wind and solar, will have desirable attributes for remote locations and greater energy savings.

The pilot system is a collaborative effort that involves partnerships between the following diverse organizations: U.S. Environmental Protection Agency; the University of Missouri-Rolla; the U.S. Army Corps of Engineers; and Bergy Wind Systems, Incorporated. Dr. Curt Elmore of the University of Missouri-Rolla will serve as a co-author and co-presenter of this poster presentation.

The pilot system has gathered the attention of local and national media. Additionally, the project has captured the attention of the public, and efforts are underway to involve K-12 students in future aspects of the study.